D-M Information Systems

DRAFT

Technical System Design (TSD)

for

SMCR 2001-20: Automated Processes to Manage General User Access to CMS Net

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Introduction

Industry “best practices” suggest that any multi-user automated system deployed on a wide-area network, such as the CMS Net system, be unavailable during those time periods for which support is not provided and when access is typically not needed, i.e. late evening and early morning hours. This enhances protection against unauthorized access to the confidential and sensitive data in CMS Net.

The CMS Net System Manager has established the hours of 7:00am to 7:00pm Monday through Friday and 9:00am to 5:00pm on Saturday as standard working hours for access and Help Desk support of CMS Net. The SCR requested that automated processes be established to enforce these hours of operation.

Functional Overview

The “7 to 7” access hours for the CMS/GHPP system create a number of new system requirements:

1. Access to the CMS/GHPP system must be granted to users automatically during standard working hours.
2. Access must be denied outside of standard working hours and when the Help Desk is closed.
3. Users who are logged on at 7pm should be automatically and gracefully logged off.
4. Managers should be able to override this automated process to extend hours as needed for updates or special work requests.

This overview outlines how these requirements can be achieved.

Automated CMS/GHPP System Access

To implement automated system access, a utility will be developed that automatically changes the Restricted User Access Status (existing) to "No One”, disallowing access after 7pm or any future designated hour. Another utility will change the status to "Open Access" in the morning. These utilities run as separate Taskman tasks created for weekdays and Saturdays allowing independent control for weekday and weekend work hours. No tasks will be scheduled for Sunday.

The use of Taskman scheduling for the changing the Restricted User Access Status fulfills the first two requirements.

User Logoff

While the evening Taskman operation will prevent new users from logging onto the system, it will not log out users who are already logged in. The existing system-wide timeouts will log out users after 30 minutes of inactivity, but it will not log out users who are still active.

Logic will be inserted in the main menu driver to check the Restricted User Access Status each time a menu is display (fixed Branch Menus excepted). The two-step process will begin with a warning 15 minutes before log-ins are restricted. The warning will start when the Restricted User Access Flag is set to "Pending Restriction". When the user returns to a menu after this flag is set, a message on the menu screen will warn the user that the system will restrict user access within the next 15 minutes and advise them to complete their current activity and log off.

The system will automatically update the flag to "No One Allowed" 15 minutes later. When the user returns to a menu after the access flag has been set to "No One Allowed", a message will be provided and the user process will be immediately terminated. By putting this check at the menu level, users will not be unceremoniously terminated from their session, which could leave partial and corrupted records throughout the database. It is anticipated that every user process will be timed-out and terminated within one hour of the change in Access Status. Reports or other jobs started before the Access Status is changed will be allowed to continue until Cache is halted for back-up at 10:00pm.

Many of the fixed Branch Menus offer a selection to identify another patient. The same logic will be added to the identify patient process. If the Restricted User Access Status has been set, the message will be displayed and the user logged off.

This functionality fulfills the third requirement.

Extended Hours

Functionality to override the automatic setting of the Restricted User Access Status will be developed allowing the System Manager to schedule extended hours, i.e. for overtime work or extended restrictions, e.g. for a system update. When these override entries exist, the Access Status will remain in the unchanged until it is manually reset or the next scheduled Taskman task takes place. System Managers will use the Fileman option in the menu to set override entries in file 6400: Restricted User Access.

This fulfills the last requirement.

General Description of Changes to the System

Log-in Process

CMS Net has in place functionality for allowing full-user access, selected user access and no user access. This functionality is based upon an entry in field .02 of file 6400: Restricted User Access.

The UNIX login for all users (except programmers) is tied to routine ^ZU which in turn calls routine ^XUS and its sub-routines.

^XUS and its sub-routines, verify the user as a valid CMS Net user by ID Code. Then field .02 of file 6400 is checked for Access Status. If status is 0, No Restriction, the user is permitted to continue. If status is 1, No One Allowed, the user is given the following message.

"We're sorry, this environment not released for use at this time…"

The message is displayed for five seconds and the user process is halted.

If the status is 2, Selected Users Only, the user's ID is matched against the entries in field .03, Permitted Users, of file 6400: Restricted User Access. If the user is not in this list, the same message as described above is shown and the user is logged off the system. If the user's ID is in the list, the user is permitted continue. This functionality is primarily used for staff to test an update before all users are permitted access to the system.

Access Status

To date, the Access Status has been manually set on an as-needed basis. With this development, four entries in file 19: Option will be scheduled to run at selected intervals setting Access Status as appropriate

A field will be added to existing file 6400: Restricted User Access File as field 1: Override Date. This field is a multiple and consists of a date entry (.01) and a Process to Override Entry (.02). Date entries must be today or in the future. Process to Override must be one of a set of codes:

1 Morning Open Access
2 Evening Deny Access
3 Both Morning and Evening

The CMS Net System Administrator has access to file 6400:Restricted User Access through the Fileman menu option. If an entry is made in the Override Date field, the system will abort any operation queued from file 19.2: Option Scheduling for the date and process(s) indicated, leaving Access Status unchanged.

User access may continue to be manually entered in the Access Status field (.02) of file 6400. Any entries made here are effective immediately for new logins.

Real-time Interruption

A new status will be added to the Access Status field of file 6400: 3 Restriction Pending. The system-wide menu driver will be modified to check the Access Status before any other processing occurs. If it is set to Restriction Pending, it will display the following message before continuing:

"Warning: System access restriction is pending. Please log off as soon as possible or call the CMS Net Help Desk if you have any questions."

Both the system-wide menu driver and the patient identification process will be modified to check the Access Status and if either of these processes sees the Access Status is set to 1 No One Allowed, it will display the following message to the user:

"System access is now restricted and you will be logged out. We apologize for the inconvenience. Please call the CMS Net Help Desk during normal business hours if you have any questions."

This message is displayed for five seconds, the user is logged off the system and all locks are released. These interruption points were selected to prevent the creation of partial or corrupt records that may result if users are logged out at other points.

This functionality applies to all menus displayed on the MP-10 and EM-10 screens and the PI-10 screen. It does not apply to option-specific branch menus.

Schedule Options

Two options will be added to file 19: Option to be used when scheduling automated processes for controlling system access in the Taskman scheduled tasks sub-system. The options may be scheduled from any namespace (i.e. GHPP or CMS) but should only be scheduled once to prevent conflicts.

The option to open access to all users in the morning will be called Set Morning Access. It is type: Run Routine with the routine am^UCHK. The option to deny access in the evening is called Set Evening Access. It is also type: Run Routine with the routine pm^UCHK. Both options are set to Scheduling Recommended =Yes, which permits them to be scheduled in Taskman.

For this specific request, four entries will be made in the Option Scheduling file, 19.2.

- Set Morning Access will be entered for 7:00am and set to Reschedule Daily at 7:00am. (Mon-Fri)
- Set Evening Access will be entered for 6:45pm and set to Reschedule daily at 6:45pm. (Mon-Fri)
- Set Morning Access will be entered for 9:00am on Saturday and set to reschedule at 9:00am weekly (Sat)
- Set Evening Access will be entered for 4:45pm on Saturday and set to reschedule at 4:45pm weekly (Sat)

No entry will be made for Sunday. The Access Status will remain as it was left Saturday evening until Monday morning unless overridden.

Operational Impact and Training Required

This development effectively enforces the hours of operation preferred by the CMS Net System Manager while providing flexibility in those hours when needed. Users will need

to notify the Help desk in advance of any need for access outside of the normal hours of operation.

System Managers will need minimal training to manage the new fields and functions of file 6400: Restricted User Access.

Assumptions, Constraints and Considerations

It has been requested that these access modifications be applied to both CMS and GHPP users. In order for this development to apply uniformly to these two applications, the GHPP application must be made current with CMS Net specifications in the following areas:

Full-Screen Log-on (CMS Specifications SCR 9924)
Full-Screen Broadcast Mail Message (CMS Specifications SCR 9923)
Full-Screen Menus (CMS Specifications SCR 9923)
Restricted User Access File (6400) (CMS Specifications SMCR 2001-20)

Uniform application of utilities such as system access control reduces development and support cost of these utilities over time. The appendix details the specific changes needed to accomplish these modifications for GHPP.

Open Issues

The Cache operating system will not be halted as a part of this development. It is required to be operating at 8:00pm for the HAP file production process to be completed. Additional development at the UNIX level is required if Cache is to be halted outside of normal hours of operation.

Design Specifications

1. Add value 3: Restriction Pending to field .02: Access Status of file 6400.
2. Add fields to file 6400:Restricted User Access for 1: Override Date (multiple) with .02: Process to Override.
3. Add fields to file 6400: Restricted User Access for 2: Namespaces for Auto Set (fully qualified directory/namespace to apply batch process).
4. Modify ^NPTID to check Restricted User Access Status.
5. Modify ^UCHK to check override and set user access status accordingly.
6. Prevent fatal error if namespace is dismounted or invalid.
7. Modify ^XQZ to check Restricted User Access Status.
8. Bring GHPP logon, menu and restricted user access processes current with CMS Net specification.
9. Add two new options for setting restricted access status.
10. Schedule options.

Technical Design Specifications

Files

Figure 1: 6400 - Restricted User Access

Screens

No Changes Required in CMS. See Appendix for GHPP.

Routines

Figure 2: ^NPTID
Figure 3: ^UCHK
Figure 4: ^XQZ
See Appendix for GHPP additional entries.

**Boxed lines indicate new code.

Listing 1: 6400: Restricted Access File

Field#	Name	Type	Width	% Usage	Glb Loc	Other Attributes
0.01	SITE	Text	3 - 20 chars.	0.00%	0;1	Required Field
0.02	ACCESS STATUS	Code		n.a	0;2	0:NO RESTRICTIONS, EVERYONE ALLOWED IN;1:NO ONE ALLOWED IN;2:SELECTED USERS ALLOWED IN;3:RESTRICTION PENDING;; Required Field
0.03	PERMITTED USERS	Pointer		0.00%	1;0	Multiple Values not verified; Pointer to File: 6400.03, PERMITTED USERS SUB-FIELD
1	OVERRIDE DATE	Date		0.00%	2;0	Link to Subfile, 6400.01, OVERRIDE DATE SUB-FIELD ; Multiple Values not verified
2	NAMESPACES FOR AUTO SET	Multi-valued Link		0.00%	3;0	Link to Subfile, 6400.02, NAMESPACES FOR AUTO SET SUB-FIELD ; Multiple Values not verified

Figure 2: NPTID

```
NPTID   ;; 19 Mar 2001, 04:34:47pm    ; PGM ; CACHE C/UX ; xx;;
        ;;M/MGMT SYSTEMS,GS;13NOV2000
        ;First check to see if restricted access is in effect; #GS# 7/2001 SCR
START   I $P(^UCHK(1,0),"^",2)=1 S cu(2)=10 D MESSAGE^XQZ G H^UCYSINON
        N Y K ^U($J,"PT"),^U($J,"TEMP"),YY,D0,DA,SDA,NPAT,MATCH
.
.
.
```

continued…

Figure 3: UCHK

```
UCHK.INT.1.58638,46594.
UCHK ;GS;09:24 AM  16 Jul 1999
 ;Check Access Status (.02) in File 6400, Restricted User Access
 ;Called by ^XUS, returns UCHK=0 if access is permitted, or positive
number = to access status.
 ;
 ;User's DUZ must be in .03 of file 6400 if access is set to selected
users only
 ;
 ;Access Status is either:
 ;               0 = EVERYONE ALLOWED; NO RESTRICTIONS
 ;               1 = NO ONE ALLOWED
 ;               2 = SELECTED USERS ONLY ALLOWED
 ;               3 = RESTRICTED ACCESS PENDING
 ;
 S UCHK=$P($G(^UCHK(1,0)),"^",2)
 I '$G(UCHK) Q
 I $G(UCHK)=1 S HEADER(1)="Sorry, this environment is not available for
use at this time.",HEADER(2)="Please try later." D EN^UMENU("MESSAGE")
Q
 I $G(UCHK)=2,'$D(^UCHK(1,1,"B",DUZ)) S HEADER(1)="Sorry, this
environment is not available for use at this time.",HEADER(2)="Please
try later." D EN^UMENU("MESSAGE") Q
 S UCHK=0
 Q
 ;
access  ;#gs#;System access control
        ;Sets .02 field of site entry in file 6400, Restricted User
Access
        ;Jobbed by Taskman Schedule
        ;Must be called at line tag am or pm
        ;
am      ;EP for open access, usually in the morning
        ;TYPE=1 is No Restrictions
        S TYPE=1 D go G done
        ;
pm      ;EP for deny access, usually in the evening
        ;TYPE=3 is Pending Restriction, TYPE=2 is No One Allowed
        S TYPE=3 D go I $G(QUITFLG)=1 G done
        D done H 900 S TYPE=2 D go G done
        ;
go      S $ZT="^%ZTER",X="T",%DT="" D ^%DT S TDAY=Y ;set today's date
        ;
nsps    s NS=0 f  s NS=$o(^UCHK(1,3,NS)) q:'NS  d onensp
        Q
        ;
done    K TYPE,QUITFLG,TEST,n,X,DT,Y,TDAY q
        ;
onensp  ;do one namespace, Quitflag at any point indicates process was
overriden in file 6400
        ;check x-ref for today's date; continue process if no oeverride
entry
        S n=$P(^UCHK(1,3,NS,0),"^",1)
        I $ZU(49,n)<0 Q  ;Invalid or dismounted UCI
```

```
        S n="^^"_n
        I $D(^[n]UCHK(1,2,"B",TDAY)) S QUITFLG=0 D  I $G(QUITFLG) Q
        .;check override entry for type
        .S
TEST=$O(^[n]UCHK(1,2,"B",TDAY,"")),TEST=$P(^[n]UCHK(1,2,TEST,0),"^",2)
        .;if override type is 3  for both, set Quitflag
        .I TEST=3 S QUITFLG=1 Q
        ;if override is am or pm, test against type from entry point
        .I TEST=TYPE S QUITFLG=1 Q
        .;if override is pm and type is 3=Pending Restriction
        .I TEST=2,TYPE=3 S QUITFLG=1 Q
        .;override is not present, continue the process
        .Q
        ;set restricted access to No Restriction if type = 1(AM), No
one allowed if type=2 (pm)
        ;otherwise selected users as a default
        S $P(^[n]UCHK(1,0),"^",2)=$S(TYPE=1:0,TYPE=2:1,TYPE=3:3,1:2)
doneone q
        ;
z       ;end of routine
```

Figure 4: XQZ

```
XQZ.INT.1.58637,47489.
XQZ ;; 01 Feb 2001, 05:51:58pm    ; PGM ; CACHE C/UX ; xx;;
 ;;GFT;10:21 AM  8 Sep 1999 ; 06 Feb 2000  4:40 PM
OPT(XQDIC) ;
.
.
.
SHOWMENU ;
        K Y,MOPT,LINE D OPT(XQY)
        S COPT=$P(^DIC(19,XQY,0),"^",2) K MOPT(0),OPT,POPT
        W:$D(cu("f")) cu("f")
        I '$D(UCIID) D SETUP^UCYFM ;#GS# 1/2000
        ;First check to see if restricted access is up ;#GS# 7/2001 7
TO 7 PROPOSAL
        I $P(^UCHK(1,0),"^",2)=1,$D(MOPT) S cu(2)=10 d MESSAGE G
H^UCYSINON
        I $P(^UCHK(1,0),"^",2)=3,$D(MOPT) S cu(2)=10 K HEADER D
MESSAGE2
        ;
        D:$D(MOPT) pass^cysr(UCIID_$P(^DSCR(13,0),"^",1),0,0)
        I $D(cu("f")) W cu("f")
.
.
;
MESSAGE ;Tell user its restricted access time and log out
        S HEADER(1)="System access is now restricted and you will be
logged out."
        S HEADER(2)="We apologize for the inconvenience. Please call
the CMS Net"
        S HEADER(3)="Help Desk during normal business hours if you have
any questions."
        D EN^UMENU("MESS3L")
        Q
        ;
MESSAGE2    ;Tell user restricted access is pending
      S HEADER(1)="Restricted system access is pending. Please log out
as soon as"
        S HEADER(2)="possible or call the CMS Net Help Desk if you have
any questions."
        D EN^UMENU("MESSAGE")
        Q
```

Appendix:

Additional modifications required for GHPP:

Files:	6400: Restricted User Access*
Globals:	^UMENU ^DSCR
Routines:	ZU UCHK NPTID XUS ZU UCYSINON UCYSOFF UCYXUS1* UCYXUS1A* UCYXM* UCYXQ* UCYXQ1*
Screens:	GHPPLS-10* GHPPMP-10*

*Indicates new to GHPP and copied from CMS.

System Manager Instructions Setting Hours of Operation

SMCR 20 gave CMS Net the ability to define the "hours of operation" be allowing or restricting user log-ins at the application level. Normally, the Taskman will schedule a morning job that "opens" the system to all log-ins and an evening job that "closes" the system to all log-ins. Similarly, the System Manager may establish an "override" to either or both of these functions for a given day. System Managers may also adjust the time of day these processes are completed by changing the schedule within Taskman.

Setting A Day-Specific Override

From the Fileman menu option, the System Manager should select the Enter/Edit File option. The file is 6400: Restricted Access Parameters. The Override Date is a standard multiple entry composed of two field, a data and a designator indicating which process to override or both. Override of either process is essentially a "no op", meaning the access flag will be left in the same state it is currently in. Usually, this will be "no logins" if the morning process is overridden or "no restrictions" if the evening process is overridden. This will not be true if the flags were changed from normal operations prior to the scheduled task.

The following is an actual terminal session for setting a morning override thus preventing user log-ins past the normal start of day operation time. The Site value will be either "CMS" or "GHPP" as appropriate. Be careful not to change or add a new site.

INPUT TO WHAT FILE: **RESTRICTED ACCESS PARAMETERS**

EDIT WHICH FIELD: ALL// **?**

Answer with FIELD NUMBER, or LABEL

Choose from:
.01 SITE
.02 ACCESS STATUS
.03 PERMITTED USERS (multiple)
1 OVERRIDE DATE (multiple)
2 NAMESPACES FOR AUTO SET (multiple)

FOLLOW A FIELD NAME WITH ';"CAPTION"' TO HAVE THE FIELD ASKED AS 'CAPTION: '

OR WITH ';T' TO USE THE FIELD 'TITLE' AS CAPTION

EDIT WHICH FIELD: ALL// **1** OVERRIDE DATE (multiple)

EDIT WHICH OVERRIDE DATE SUB-FIELD: ALL// **?**

Answer with OVERRIDE DATE SUB-FIELD NUMBER, or LABEL
Choose from:
.01 OVERRIDE DATE
.02 PROCESS TO OVERRIDE

FOLLOW A FIELD NAME WITH ';"CAPTION"' TO HAVE THE FIELD ASKED AS 'CAPTION: '

OR WITH ';T' TO USE THE FIELD 'TITLE' AS CAPTION

EDIT WHICH OVERRIDE DATE SUB-FIELD: **ALL**

THEN EDIT FIELD:

Select RESTRICTED ACCESS PARAMETERS SITE: CMS NET

Select OVERRIDE DATE: **T** 08/16/2001

PROCESS TO OVERRIDE: **?**

Choose from:
1 MORNING OPEN ACCESS
2 EVENING DENY ACCESS
3 BOTH MORNING AND EVENING

PROCESS TO OVERRIDE: **1** MORNING OPEN ACCESS

Select OVERRIDE DATE:

Override dates will remain in the file until removed by either the System Manger or Application Technical Support. Date entries in the past do not affect the process.

The Restricted Access Parameter file also has a multiple field for namespaces included in the scheduled set access processes. Namespaces will only be processed from the SAME namespace as the Taskman job is scheduled (see below). Taskman jobs should be scheduled from only ONE namespace.

Namespace entries must be fully qualified as follows:

```
Select RESTRICTED ACCESS PARAMETERS SITE: CMS NET

SITE: CMS NET//

ACCESS STATUS: SELECTED USERS ALLOWED IN//
```

```
Select PERMITTED USERS:

Select OVERRIDE DATE:

Select NAMESPACES FOR AUTO SET: /cachesys/cmsd/

Select NAMESPACES FOR AUTO SET: /cachesys/ghpd/

Select NAMESPACES FOR AUTO SET:

Select RESTRICTED ACCESS PARAMETERS SITE:
```

Scheduling the Options

```
INPUT TO WHAT FILE: 19.2  OPTION SCHEDULING
                                              (1 entry)
EDIT WHICH FIELD: ALL//

Select OPTION SCHEDULING NAME: SET

1   SET EVENING ACCESS  OPMT-SET EVENING ACCESS     SET
EVENING ACCESS

     2   SET EVENING ACCESS (SAT)  OPMT-SET SAT EVENING
ACCESS     SET EVENING ACCESS (SAT)

     3   SET MORNING ACCESS  OPMT-SET MORNING ACCESS
SET MORNING ACCESS

     4   SET MORNING ACCESS (SAT)  OPMT-SET SAT MORNING
ACCESS     SET MORNING ACCESS (SAT)

     5   SET TYPE OF MUMPS OPERATING SY  DI SET MUMPS OS
Set Type of Mumps Operating System

CHOOSE 1-5: 3  OPMT-SET MORNING ACCESS   SET MORNING ACCESS

  Are you adding 'OPMT-SET MORNING ACCESS' as
    a new OPTION SCHEDULING (the 2ND)? No// Y  (Yes)

QUEUED TO RUN AT WHAT TIME: T+1@0800  (08/17/2001@8:00AM)

DEVICE FOR QUEUED JOB OUTPUT:

OTHER DEVICE PARAMETERS:
```

QUEUED TO RUN ON VOLUME SET:

RESCHEDULING FREQUENCY: **D@0800**

SPECIAL QUEUEING:

Select VARIABLE NAME:

TASK ID: 152126//

TASK PARAMETERS:

A task may only be scheduled for a future time and/or date, so in this example, the Set Morning Access option was scheduled to run tomorrow (T+1) at 8am. It was then set to reschedule itself daily at 8am by entering D@0800. By definition "daily" excludes Saturday and Sunday. Weekend jobs must be scheduled separately. A question mark entered at the Rescheduling Frequency prompt will list some of the options. Entering w@0900 would indicate once weekly at 9am.

The Kernel Taskman options may also be used to Schedule and Unschedule Tasks, however, they go into a Screenman format requiring an understanding and mapping of keyboard commands. Since Screenman is not used in CMS Net, it may simpler to use the Fileman option for entering and editing entries in file 19.2, Option Scheduling. The Taskman options are quite nice, however, for viewing future tasks.